What is claimed is:

1.   A multiplex system comprising:

a predecessor and a successor having identical function to each other;

5   an input data buffer for temporarily storing input data to be supplied to said predecessor and said successor;

an output data buffer for temporarily storing output data from said predecessor;

10   a comparator for comparing output data from said successor with output data from said predecessor stored in said output data buffer;

a gate for controlling outputting of said output data from said successor to the outside of the multiplex system in accordance with a result of the comparison by said comparator; and

an execution controller for confirming that said predecessor has normally completed a processing operation on a unit of input data, and allowing said successor to start an operation of processing input data which has been already processed by said predecessor.

2.   The multiplex system according to claim 1, wherein said execution controller comprises:

a predecessor monitor for monitoring whether or not said predecessor has normally executed an operation of processing input data; and

a successor controller for controlling start of an operation of processing the next input data by said successor in accordance with a result of monitoring the operation of the predecessor by said predecessor monitor.

3. The multiplex system according to claim 2, further comprising

status recovering means for copying, when an operation failure of said predecessor is detected by said predecessor monitor, the status of said successor before start of processing on the input data to said predecessor, thereby recovering the status of said predecessor to the same status as that in said successor.

4. The multiplex system according to claim 3, wherein said predecessor monitor has means for instructing said predecessor to re-process input data which has failed due to said operation failure at a predetermined timing after the status of said predecessor is recovered by said status recovering means,

5. The multiplex system according to claim 2, wherein said execution controller has means for allowing, when discrepancy of output data of said predecessor and successor is detected by said comparator, said predecessor and successor to re-execute processing on input data corresponding to said output data.

6. The multiplex system according to claim 5, wherein said re-executing means confirms that said predecessor has normally finished the re-execution of processing on said input data and allows said successor to re-execute the processing on said input data.

7. The multiplex system according to claim 2, wherein said predecessor monitor includes output time-out detecting means for detecting whether or not a result is output within predetermined time since processing on a unit of input data is started.

8. The multiplex system according to claim 4, further comprising switching means for switching said successor controller from a normal mode to a reduced mode, when a failure occurs in reprocessing on the same input data by said predecessor, thereby to allow said

successor controller to sequentially start the processing operation on next input data by said successor irrespective of a result of monitoring the operation of the predecessor by said predecessor

5 monitor, and to deliver output data from said successor system to the outside via said gate.

9. The multiplex system according to claim 7, wherein said switching means switches said successor

10 controller to said reduced mode in response to a failure notification generated by said predecessor monitor when the number of repetition of the reprocessing on the same input data by said predecessor becomes a predetermined number.

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10. The multiplex system according to claim 1, further comprising:

a successor monitor for monitoring whether or not said successor normally executes an operation of

20 processing input data; and

status recovering means for copying the status of said predecessor before start of processing on the next input data to said successor when an operation failure of said successor is detected by said successor

25 monitor, thereby recovering the status of said

successor to the same status as that in said predecessor.

11. A multiplex system comprising:

a first system and a second system having identical function to each other;

an input data buffer for temporarily storing input data to be supplied to said first and second systems;

a predecessor monitor for monitoring whether or not said first system has normally completed a processing operation on a unit of input data; and

a successor controller for controlling start of processing operation by said second system on the input data already processed by said first system in accordance with a result of monitoring by said predecessor monitor.

12. The multiplex system according to claim 11, further comprising

means for copying, when an operation failure is detected in said first system by said predecessor monitor, a status of said second system to said first system and, at a predetermined timing, instructing said first system to re-process the input data which has not been successfully processed due to said operation

failure.

13.   A multiplex system comprising:

first to n-th systems (where n denotes 3 or larger)

5   having identical function;

an input data buffer for temporarily storing input

data to be supplied to said first to n-th systems;

(n-1) output data buffers for temporarily storing

output data from said first system to the (n-1)th system,

10   respectively;

(n-1) comparing means for comparing output data

stored in the i-th output data buffer (where i = 1 to

n-1) with output data from the (i+1)th system;

gate means for controlling delivering of output

15   data from said n-th system to the outside in accordance

with results of the comparison by said plurality of

comparators; and

(n-1) execution controlling means for confirming

that said i-th system (i = 1 to n-1) has normally

20   completed a processing operation on a unit of input

data, and allowing the (i+1)th system to start an

operation of processing said input data processed by

the i-th system.

25   14.   A multiplex system comprising:

a first, second, and third systems having identical function to each other;

an input data buffer for temporarily storing input data to be supplied to said first, second, and third

5 systems;

an output data buffer for temporarily storing output data from said first system;

a comparator for comparing output data from said second system with output data from said first system,

10 stored in said output data buffer;

a gate for controlling delivering of said output data from said second system to the outside in accordance with results of the comparison by said plurality of comparators;

15 a first execution controller for confirming that said first system has normally completed a processing operation on a unit of input data, and allowing said second system to start an operation of processing the next input data already processed by said first system;

20 a second execution controller for confirming that said second system has normally completed a predetermined processing operation on a unit of input data, and allowing said third system to start an operation of processing the next input data already

25 processed by said second system; and

means for copying a status of said third system

to said first and second systems when discrepancy of

output data is detected by said comparator.

5   15.   A multiplex system comprising:

a first, second, and third systems having

identical function to each other;

an input data buffer for temporarily storing input

data to be supplied to said first, second, and third

10   systems;

a first output data buffer for temporarily storing

output data from said first system;

a second output data buffer for temporarily

storing output data from said second system;

15   a first comparator for comparing the output data

from said second system with the output data from said

first system stored in said first output data buffer;

a second comparator for comparing output data from

said third system with output data from said second

20   system stored in said second output data buffer;

a gate for controlling delivering of said output

data from said third system to the outside in accordance

with results of the comparison by said first and second

comparators;

25   a first execution controller for confirming that

said first system has normally completed a processing

operation on a unit of input data, and allowing said

second system to start an operation of processing the

input data already processed by said first system; and

5   a second execution controller for confirming that

said second system has normally completed a processing

operation on a unit of input data, and allowing said

third system to start an operation of processing the

input data already processed by said second system.

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16.   The multiplex system according to claim 15,

wherein said first execution controller has means

for copying, when an operation failure is detected in

said first system, a status of said second system before

15   a processing on next input data is started into said

first   system,   and   allowing   the   first   system   to

re-execute processing on input data which has not been

successfully processed due to said operation failure,

and

20   said second execution controller has means for

copying, when an operation failure is detected in said

second system, a status of said third system before

processing on next input data is started into said

second   system,   and   allowing   the   second   system   to

25   re-execute process on input data which has not been

successfully processed due to said operation failure.